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The effects of microplastic on freshwater *Hydra attenuata* feeding & morphology

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Microplastic in the Environment:

Marine

- Accumulating on shorelines worldwide
- Many marine organisms ingesting microplastic
- Most research focused here

Freshwater

- Present in lakes and rivers
- Research lacking

Knowledge Gap

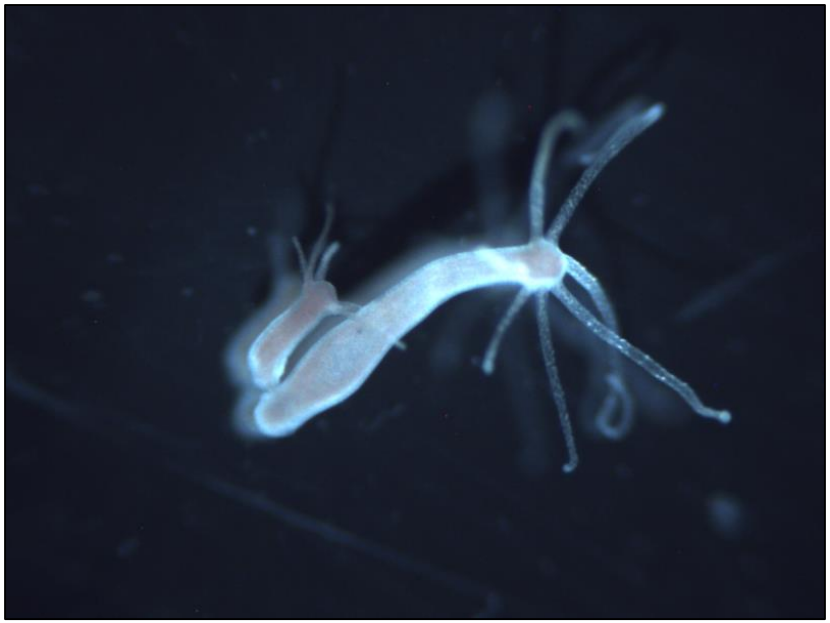
- There are currently no standardised tests for assessing the impact of microplastic

Current Research:

- **Question:**
  - Can microplastic have an impact on freshwater organisms?
- Investigating the effect of microplastics on the feeding & morphology of a freshwater cnidarian, *Hydra attenuata*
- **Aims:**
  - Determine if *Hydra* can ingest microplastic
  - Determine if microplastic can effect the feeding of *Hydra*
  - Determine if microplastic can effect the morphology of *Hydra*

Hydra attenuata:

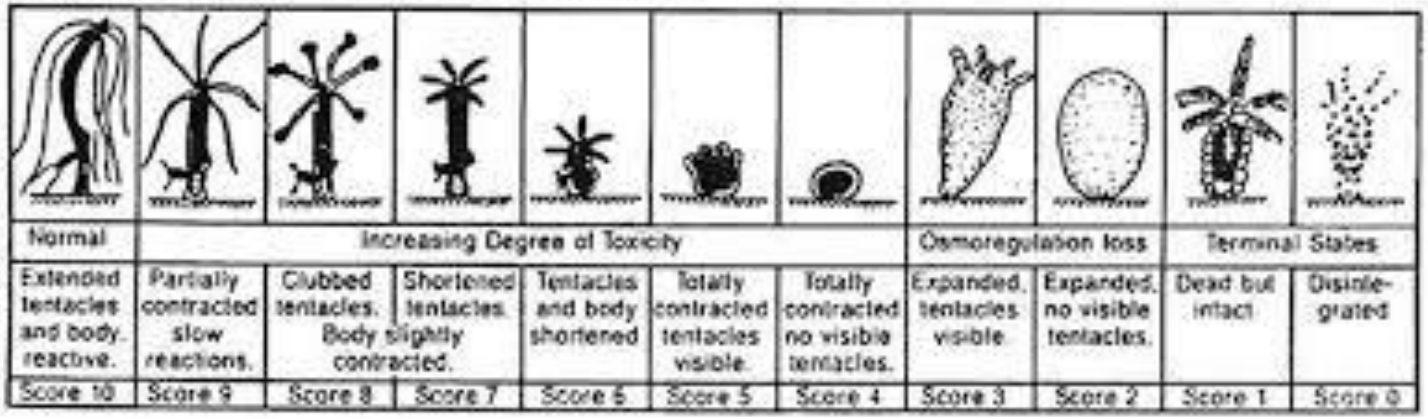
- Used widely in bioassays to test the toxicity of environmental contaminants (Quinn et al., 2008)



Hydra Feeding & Morphology:

- Fed *Artemia salina*

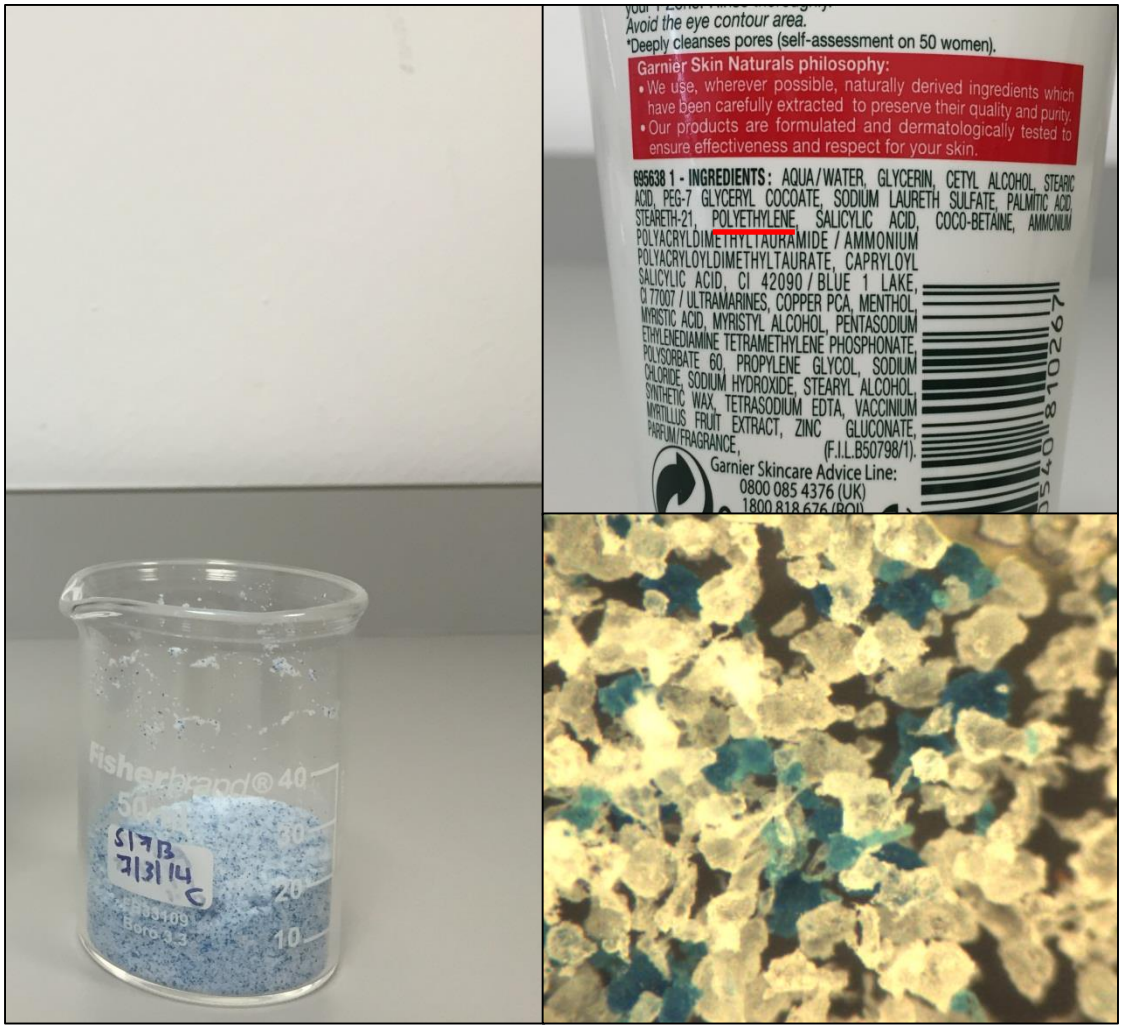
Hydra morphology – Toxicity to polyp phase



Normal	Increasing Degree of Toxicity						Osmoregulation loss		Terminal States	
Extended tentacles and body reactive.	Partially contracted slow reactions.	Clubbed tentacles. Body slightly contracted.	Shortened tentacles.	Tentacles and body shortened	Totally contracted tentacles visible.	Totally contracted no visible tentacles.	Expanded, tentacles visible.	Expanded, no visible tentacles.	Dead but intact	Disintegrated
Score 10	Score 9	Score 8	Score 7	Score 6	Score 5	Score 4	Score 3	Score 2	Score 1	Score 0

Wilby (1988)

Microplastic (MP):

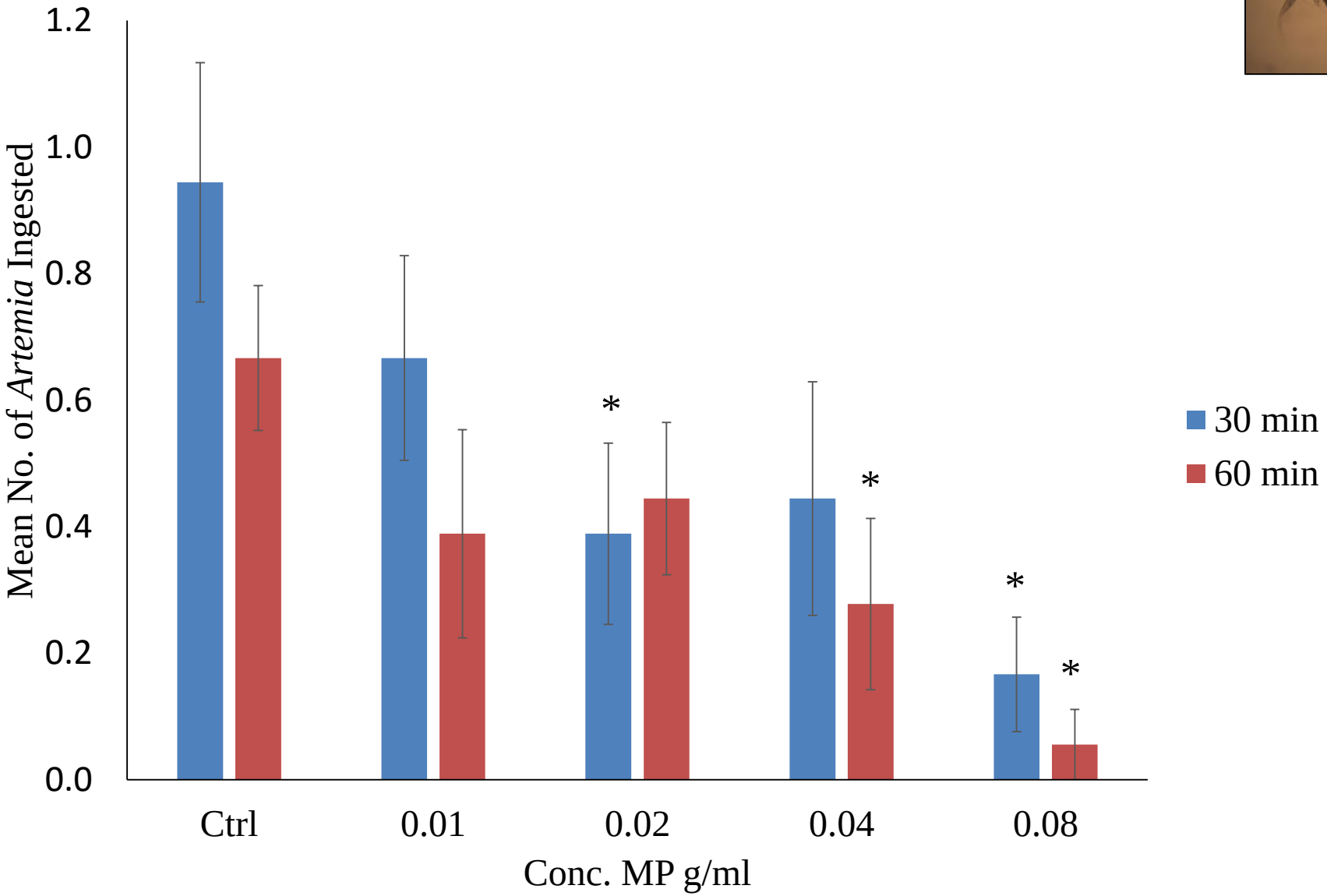


- MP <400 µm

Exposure:

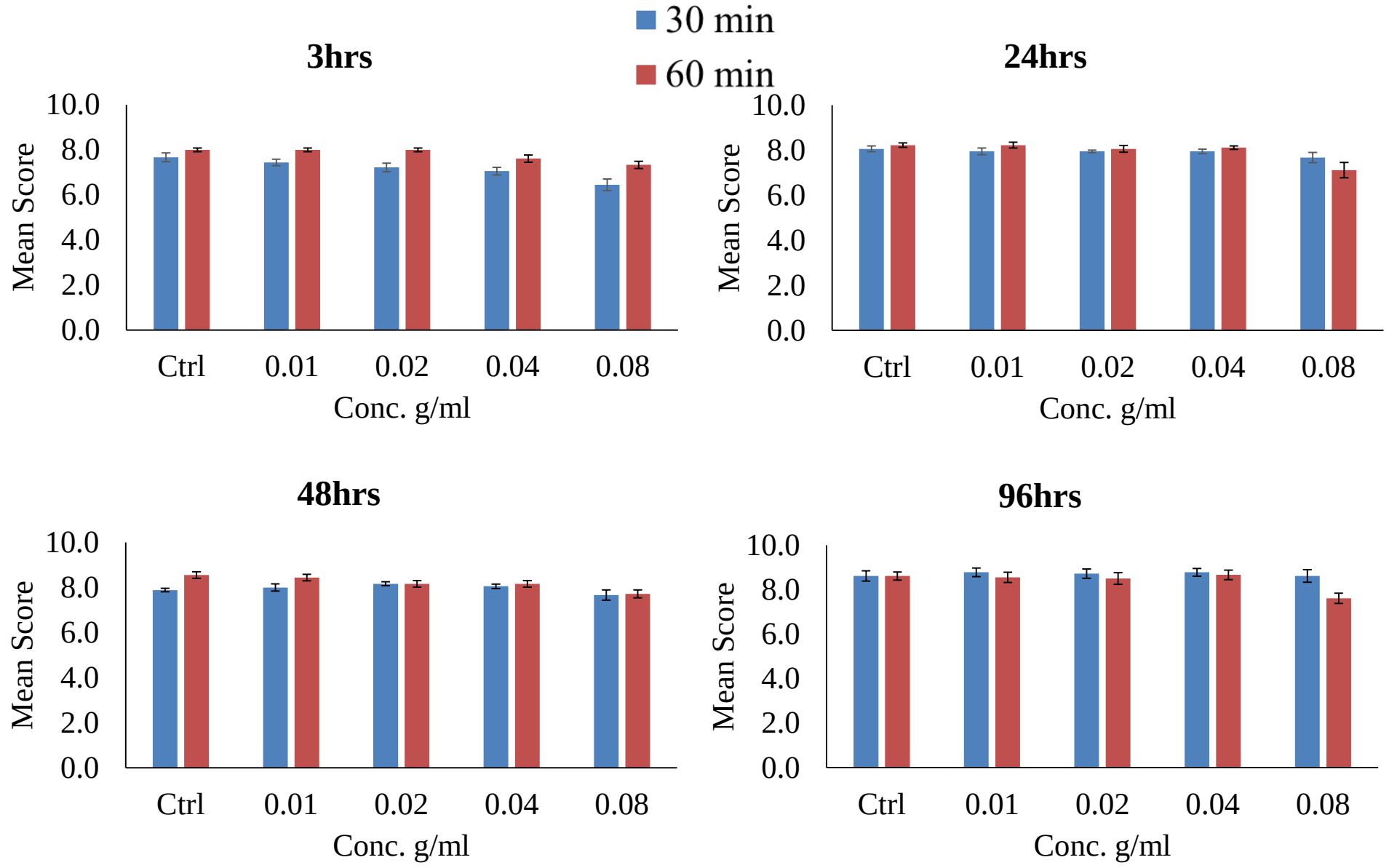
- *Hydra* starved for three days
- Placed in 0.5 ml Eppendorf tubes containing MP
- Concentrations: Control, 0.01, 0.02, 0.04, 0.08 g/ml
- 10 *Artemia* added
- Ingestion of MP & *Artemia* checked after 30 & 60 min
- Morphology recorded after 3, 24, 48, & 96 hrs

Feeding Rate:



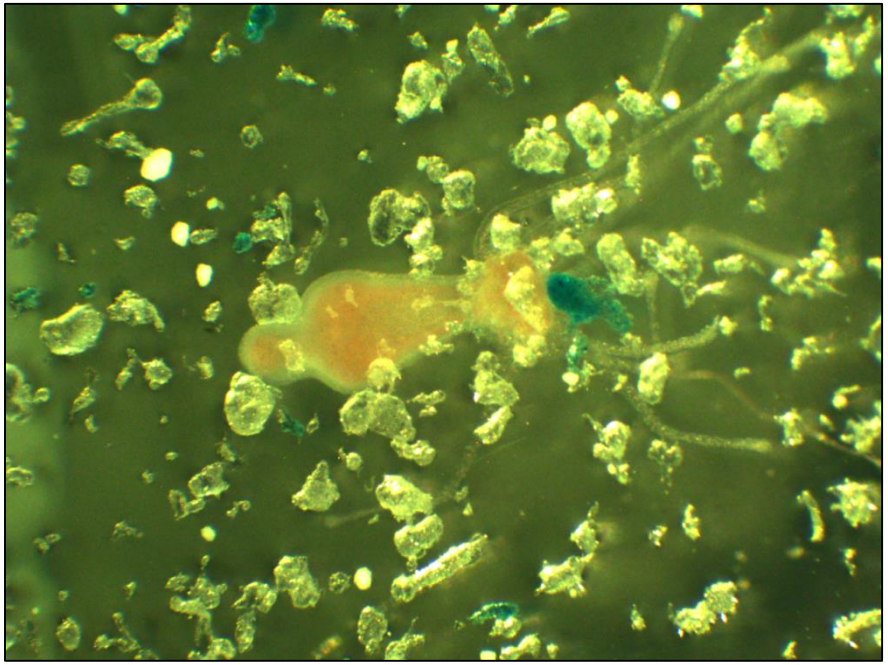
Ingestion of MP:

Morphology Scores:



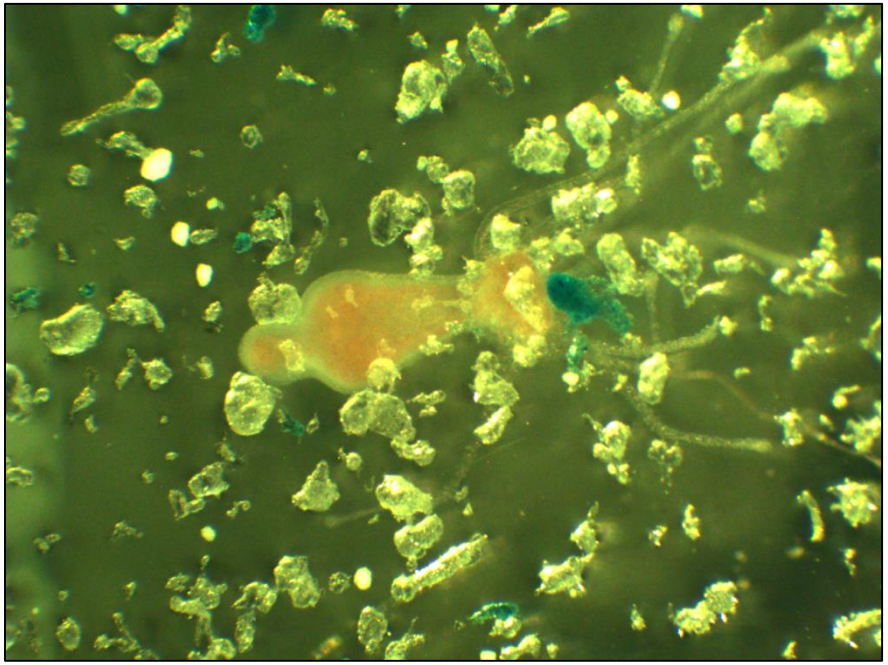
Other observations:

- Buoyancy change
- Attachment to microplastic



Conclusions:

- *Hydra* are capable of ingesting microplastic
- The presence of microplastic disrupted the feeding of the *Hydra*



Implications for the environment:

- MP can potentially have an effect on feeding
- Feeding is an ecologically relevant endpoint
- Could alter community structure

Thank You

Questions?

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